



Herculaneum Smelting Division

Gary F. Hughes
General Manager Primary Smelting

Via Electronic and Regular Mail

September 27, 2012

Ms. Leslye Werner
Chief of Air Enforcement and Compliance
U.S. EPA, Region 7
901 North 5th Street
Kansas City, KS 66101

Dear Ms. Werner:

Thank you for speaking with me on Monday, September 17, regarding Consent Decree production caps for the Herculaneum Smelting Division. Attached are four tables that provide the requested information:

- Table 1 - Nov 2010 – Oct 2011 Appendix A Production and SO₂ Emission Data
- Table 2 - Sept 2011 – Aug 2012 Appendix A Production and SO₂ Emission Data
- Table 3 - Acid Plant Gas Strength Requirements
- Table 4 - Proposed 2013 Lead Production and SO₂ Emissions - Comparison

The November 2010 – October 2011 time period (Table 1) represents the first year with the smelter operating under the Consent Decree 12 month rolling production caps. It also corresponds with the Doe Run fiscal production year. The September 2011 – August 2012 time period (Table 2) represents 12 month data that takes us through August 2012, the most recent completed full month of production. This data will be included in the semi-annual production report and was validated and quality checked for accuracy. The acid plant gas strength requirement chart, and proposed 2013 lead production and SO₂ emissions data, part of the presentation made to EPA Region 7 on August 29, is included for your review.

Below Table 2, the data for November 2010 – August 2011 (from Table 1) and November 2011 – August 2012 (from Table 2) has been summarized to compare the same monthly periods, although different years, for tons of SO₂ emitted, tons of lead produced and a calculated normalizing ratio of pounds of SO₂ emitted per ton of lead produced.

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The November 2010 – August 2011 data includes a scheduled summer outage, July 10 – August 6. The November 2011- August 2012 data includes continuous operation throughout the summer due to an electrical fire outage in March/April.

What the data shows is higher SO₂ emissions, 2,317 tons, in the November 2011 – August 2012 operating period as compared to the November 2010 – August 2011 operating period. It also shows a higher SO₂ emission rate per ton of lead produced, 286 Lbs. /ton vs. 235 Lbs. /ton.

In general, this is a result of operating throughout the hot weather summer months which requires higher percentages of SO₂ at the acid plant. The data also shows the seasonal variation for both time periods and how significant the increase is with continuous summer operation. With planned summer outages, the seasonal increase was limited to 6% (14 Lbs SO₂/Ton Pb) while without the summer outages the seasonal increase was 30% (78 Lbs SO₂/Ton Pb) The basis for the seasonal increase in SO₂ emissions is illustrated in Table 3, which shows the required increase in SO₂ strength with respect to increased air temperature in order to maintain 93.5% sulfuric production.

The Herculaneum smelter utilizes a conventional sinter machine-acid plant operation to oxidize the sulfur contained in the lead sulphide concentrate to produce lead oxide (sinter) and SO₂ gas. The SO₂ gas is captured and then converted into sulfuric acid in a conventional metallurgical sulfuric acid plant. In order to capture SO₂ gases of sufficient strength and suitable for conversion in an acid plant, all conventional sinter machines are physically divided into a strong gas section (the oxidation zone) and a weak gas section (the cooling zone). The strong gas section of the sinter machine produces SO₂ gases typically ranging from 2.5% to 4.5% SO₂ depending on machine feed rate and gas volume captured. The weak gas section of the sinter machine, where primary cooling of the sinter occurs, produces a very weak SO₂ gas that is captured and processed through a baghouse operation to remove particulate prior to discharge. It is this weak SO₂ gas stream that accounts for the majority of smelter SO₂ emissions.

As we discussed, the acid plant is the smelter's primary SO₂ control system. Acid plants are designed to make 93% sulfuric acid. Without higher SO₂ gas strength in hotter summer months, acid plants will produce weaker than design sulfuric acid. As the acid concentration drops, the corrosion rate increases dramatically, putting acid plants at high risk of failure. To manage the gas strength requirement, Herculaneum must reduce overall SO₂ capture to concentrate the gas stream going to the acid plant. This is typically accomplished by reducing acid plant volume thereby pulling less dilution and reducing overall SO₂ capture. An alternative is to significantly increase the rate of sulfur oxidation by increasing the feed rate at the sinter plant.

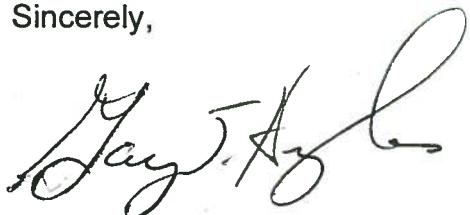
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Operating in either of these manners results in increased SO₂ concentrations in the weaker SO₂ stream going through the baghouse operation and higher SO₂ emissions. Thus, planning available downtime during the hotter summer month's results in lower total SO₂ emissions due to the seasonal emission rates shown in the data comparison below Table 2.

The presentation made to EPA on August 29 showed modeled production and emission scenarios for the Doe Run fiscal year November 2012 – October 2013. The model shows that lower SO₂ emissions will be achieved (Table 4) by managing the production plan for fiscal year 2013 with a summer downtime period as opposed to repeating exactly the same production rate and schedule that occurred in fiscal year 2012. However, if the plant returns to this normal schedule, during April, May and June, the 12 month rolling production cap for lead, sinter and SO₂ would be exceeded. For the succeeding months, production drops below the 12 month cap and, for SO₂, is ultimately lower at year end.

We appreciate your consideration of the above data and discussion. My technical staff is always available to answer questions or provide additional information if necessary.

Sincerely,



Gary F. Hughes
General Manager Primary Smelting Division

GFH:dmw

cc: Steve Sanders
Don Toensing
Dana Skelly

Table 1

Herculaneum Production - Consent Decree Compliance

In Tons

| | Nov-10 | Dec-10 | Jan-11 | Feb-11 | Mar-11 | Apr-11 | May-11 | Jun-11 | Jul-11 | Aug-11 | Sep-11 | Oct-11 | Rolling Numbers |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------------|
| Finished Goods Cast | 10,502 | 14,127 | 12,208 | 9,574 | 9,238 | 12,916 | 13,205 | 12,265 | 6,173 | 10,900 | 14,306 | 4,491 | 129,905 |
| Alloy Metal Contained | 45 | 58 | 52 | 45 | 35 | 58 | 50 | 56 | 23 | 42 | 60 | 41 | 566 |
| Other Non Lead Metals Contained | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 2 |
| Refined Lead Metal Production | 10,457 | 14,069 | 12,156 | 9,530 | 9,203 | 12,858 | 13,155 | 12,208 | 6,150 | 10,858 | 14,246 | 4,450 | 129,338 |
| Consent Decree Refined Lead Metal Production Limit | | | | | | | | | | | | | 130,000.0 |
| Variance | | | | | | | | | | | | | 662 |
| Sinter Produced | 23,888 | 30,466 | 27,292 | 22,202 | 17,318 | 29,780 | 30,572 | 27,388 | 10,490 | 25,614 | 32,231 | 8,999 | 286,240 |
| Consent Decree Sinter Produced Limit | | | | | | | | | | | | | 326,370 |
| Variance | | | | | | | | | | | | | 40,130 |
| Sinter Consumed | 24,620 | 33,699 | 26,107 | 19,285 | 20,721 | 29,472 | 30,130 | 28,332 | 11,393 | 25,599 | 31,728 | 8,724 | 289,810 |
| Consent Decree Sinter Consumed Limit | | | | | | | | | | | | | 326,370 |
| Variance | | | | | | | | | | | | | 36,560 |
| Main Stack SO2 | 1,087 | 1,687 | 1,449 | 1,198 | 997 | 1,425 | 1,570 | 1,587 | 636 | 1,357 | 1,599 | .355 | 14,947 |
| Consent Decree Main Stack SO2 Limit | | | | | | | | | | | | | 18,501 |
| Variance | | | | | | | | | | | | | 3,554 |

SUMMARY

| Summer Down Nov 10 - Aug 11 | |
|----------------------------------|-----------|
| Tons of SO2 | 12,993 |
| Tons of Pb | 110,642 |
| Lbs SO2 / Ton Pb | 235 |
| | |
| Nov10 - May 11 Jun 11 - Aug 11 | |
| Lbs SO2/Ton Pb | 231 245 |
| Spread | 14 |

| No Summer Down Nov 11 - Aug 12 | |
|-----------------------------------|-----|
| 15,310 | |
| 106,887 | |
| 286 | |
| | |
| Nov11 - May 12 Jun 12 - Aug 12 | |
| 258 | 336 |
| 78 | |

| Variance |
|----------|
| 2,317 |
| (3,755) |
| 52 |
| |
| 64 |

Table 2

Herculanum Production - Consent Decree Compliance

In Tons

| | Sep-11 | Oct-11 | Nov-11 | Dec-11 | Jan-12 | Feb-12 | Mar-12 | Apr-12 | May-12 | Jun-12 | Jul-12 | Aug-12 | Rolling Numbers |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------------|
| Finished Goods Cast | 14,306 | 4,491 | 11,010 | 13,828 | 12,376 | 9,670 | 6,234 | 434 | 14,558 | 13,439 | 10,516 | 15,273 | 126,135 |
| Alloy Metal Contained | 50 | 41 | 59 | 53 | 55 | 39 | 27 | 0 | 50 | 48 | 49 | 70 | 551 |
| Other Non Lead Metals Contained | 0.2 | 0.1 | 0.2 | 0.2 | 0.1 | 0.2 | 0.1 | 0.0 | 0.2 | 0.3 | 0.1 | 0.2 | 2 |
| Refined Lead Metal Production | 14,246 | 4,450 | 10,950 | 13,775 | 12,321 | 9,631 | 6,207 | 434 | 14,507 | 13,390 | 10,468 | 15,203 | 125,583 |
| Consent Decree Refined Lead Metal Production Limit | | | | | | | | | | | | | 130,000.0 |
| Variance | | | | | | | | | | | | | 4,417 |
| Sinter Produced | 32,231 | 8,999 | 29,713 | 27,269 | 28,000 | 26,934 | 6,372 | 665 | 32,015 | 30,044 | 23,901 | 32,842 | 278,985 |
| Consent Decree Sinter Produced Limit | | | | | | | | | | | | | 326,370 |
| Variance | | | | | | | | | | | | | 47,385 |
| Sinter Consumed | 31,728 | 8,724 | 29,943 | 26,776 | 27,174 | 27,912 | 7,379 | - | 32,595 | 30,641 | 23,331 | 33,536 | 279,739 |
| Consent Decree Sinter Consumed Limit | | | | | | | | | | | | | 326,370 |
| Variance | | | | | | | | | | | | | 46,631 |
| Main Stack SO2 | 1,599 | 355 | 1,401 | 1,655 | 1,652 | 1,623 | 361 | 40 | 2,016 | 2,265 | 2,087 | 2,210 | 17,264 |
| Consent Decree Main Stack SO2 Limit | | | | | | | | | | | | | 18,501 |
| Variance | | | | | | | | | | | | | 1,237 |

SUMMARYSummer Down
Nov 10 - Aug 11

| | |
|------------------|---------|
| Tons of SO2 | 12,993 |
| Tons of Pb | 110,642 |
| Lbs SO2 / Ton Pb | 235 |

No Summer Down
Nov 11 - Aug 12

| | |
|--|---------|
| | 15,310 |
| | 106,887 |
| | 286 |

Variance

| |
|---------|
| 2,317 |
| (3,755) |
| 52 |

| | Nov10 - May 11 | Jun 11 - Aug 11 |
|----------------|----------------|-----------------|
| Lbs SO2/Ton Pb | 231 | 245 |
| Spread | 14 | |

| | Nov11 - May 12 | Jun 12 - Aug 12 |
|--|----------------|-----------------|
| | 258 | 336 |
| | 78 | |

| |
|----|
| 64 |
|----|

Table 3

Herculaneum Smelting Division



Required gas strength to make 93.5% acid at various temperatures.

| Air Temperature (°F) | 80 | 90 | 100 | 110 |
|-------------------------------------|-----|-----|-----|-----|
| Gas Strength (%SO ₂) | 2.9 | 4.1 | 5.7 | 7.9 |

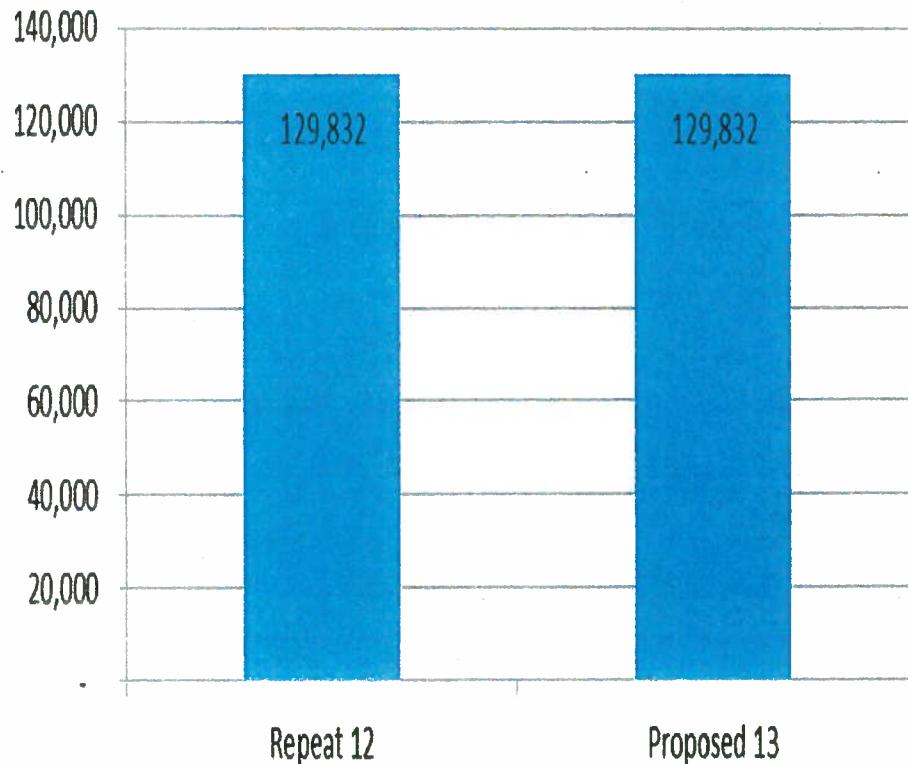
Table 4

Herculaneum Smelting Division



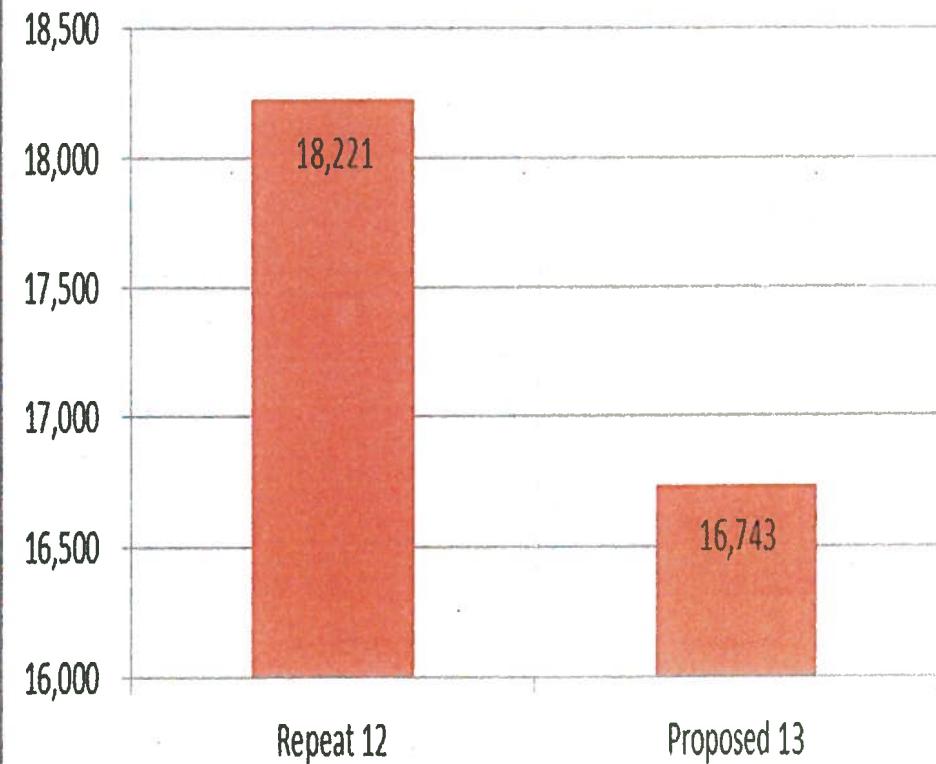
Pb Production

(Tons)



Predicted SO₂ Emissions

(Tons)



Doe Run Meeting

EPA, 27 offices

12/3/12

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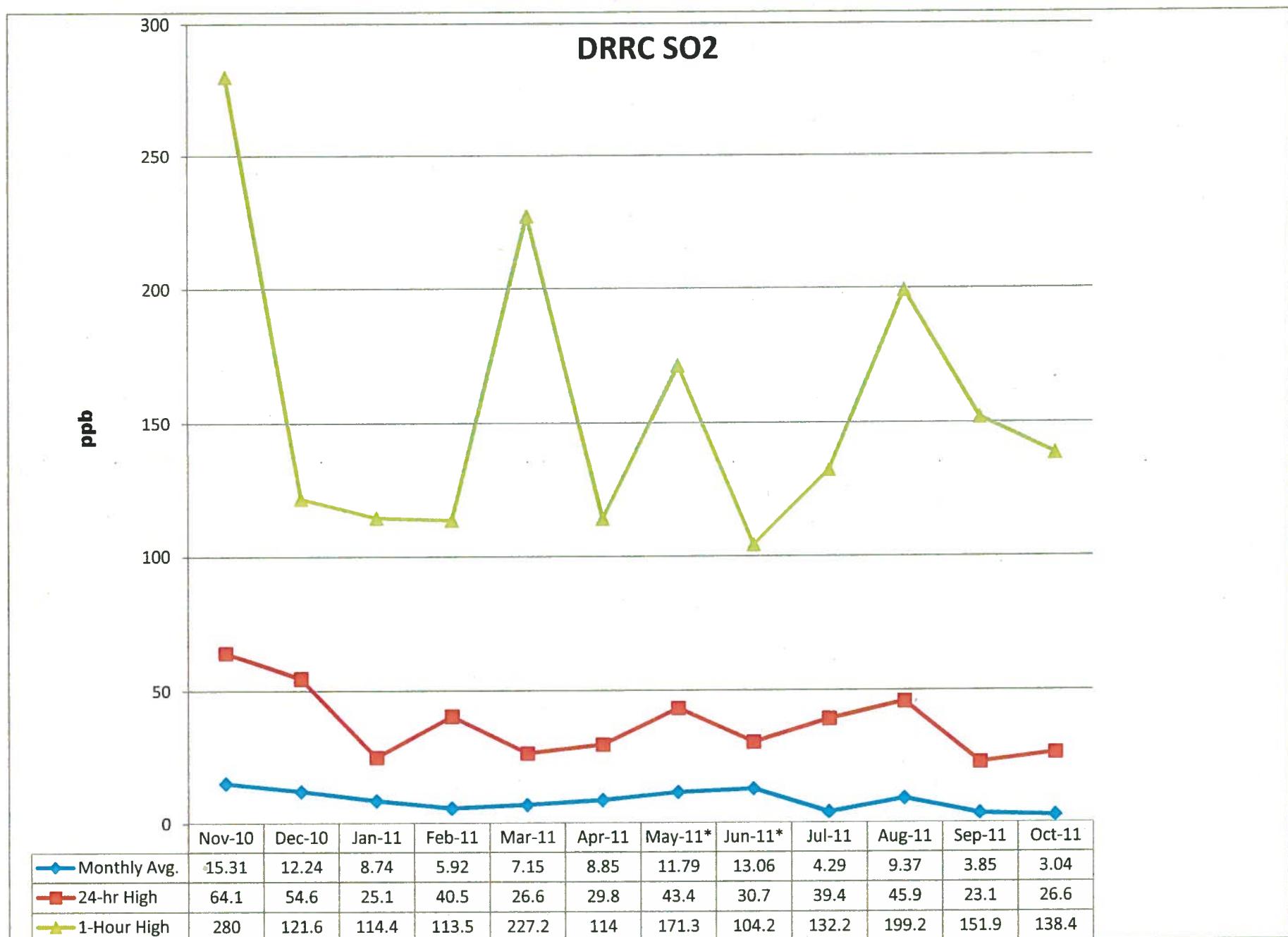
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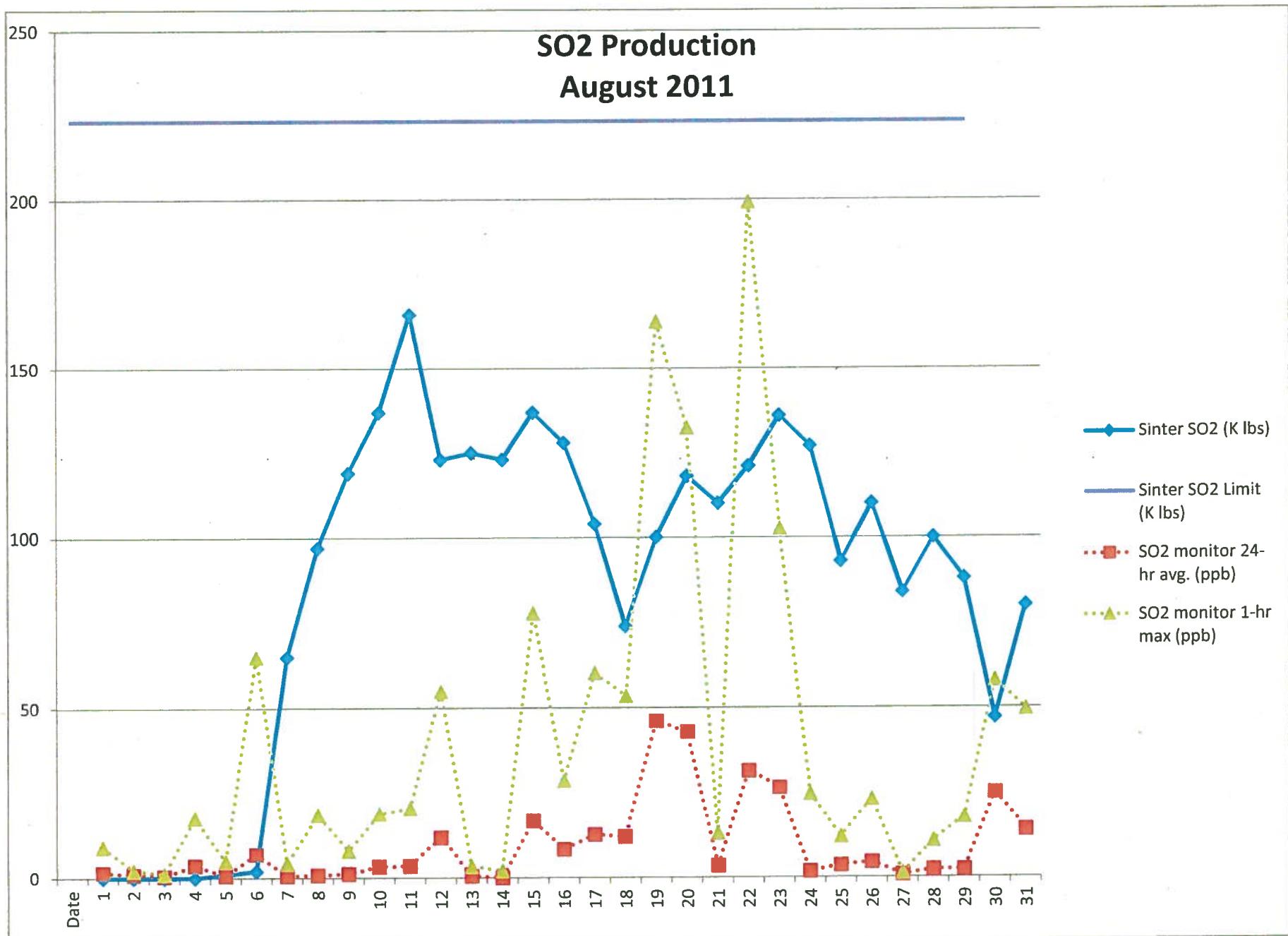
Leanne Tippett Mosby Mo DNR 573-751-4732

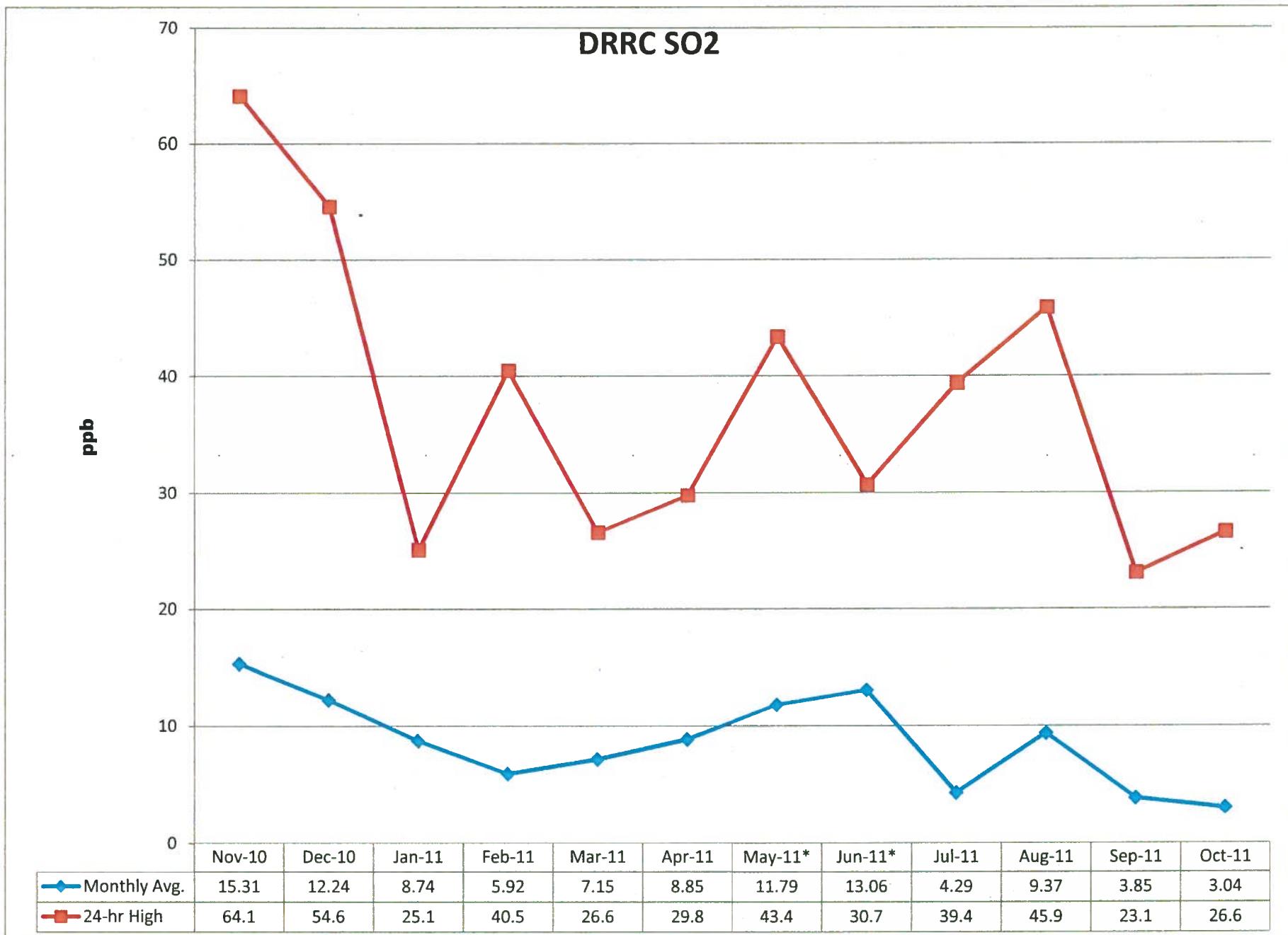
Leanne.Tippett.Mosby@dnr.mo.gov



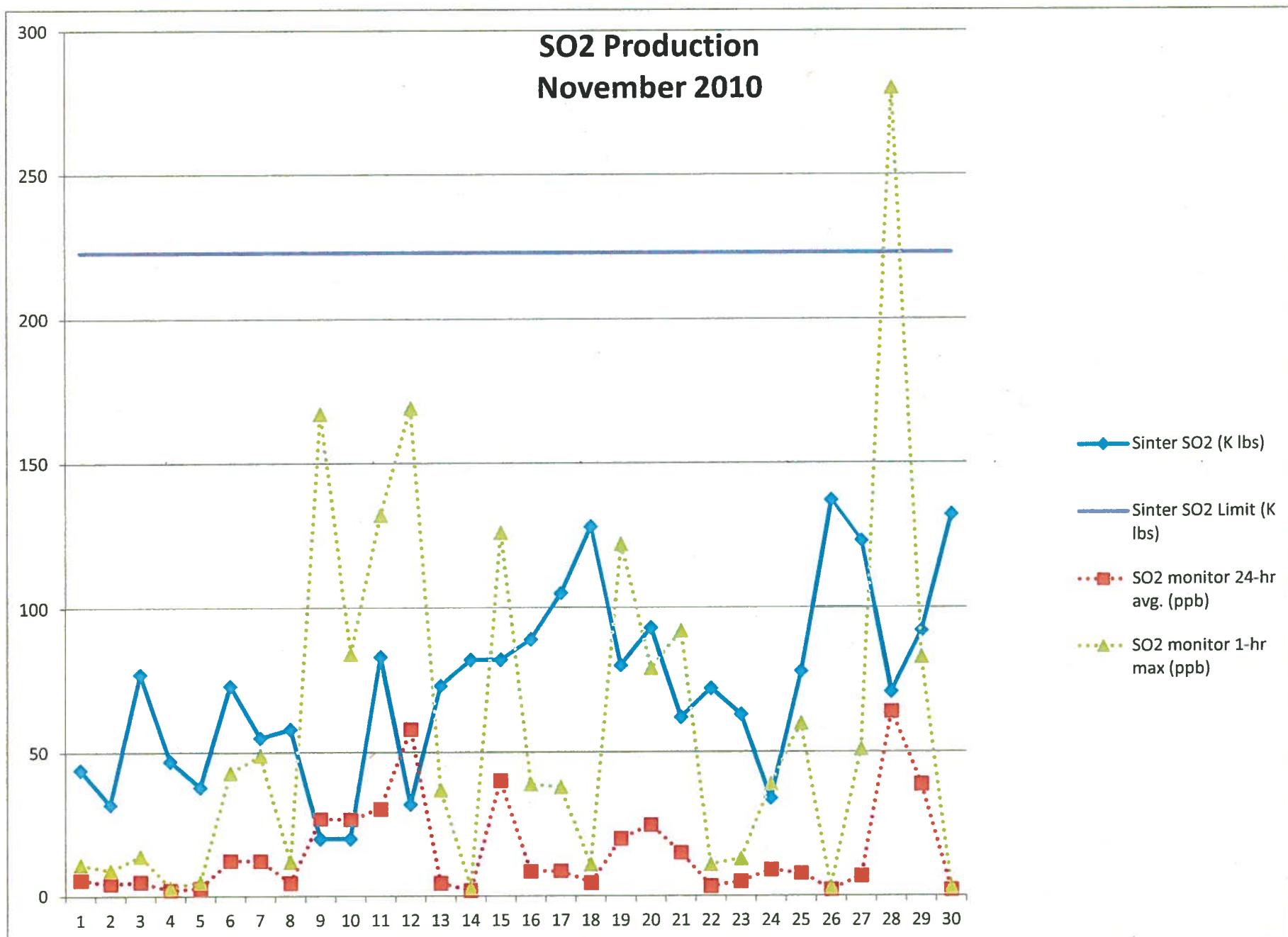
SO2 Production

August 2011

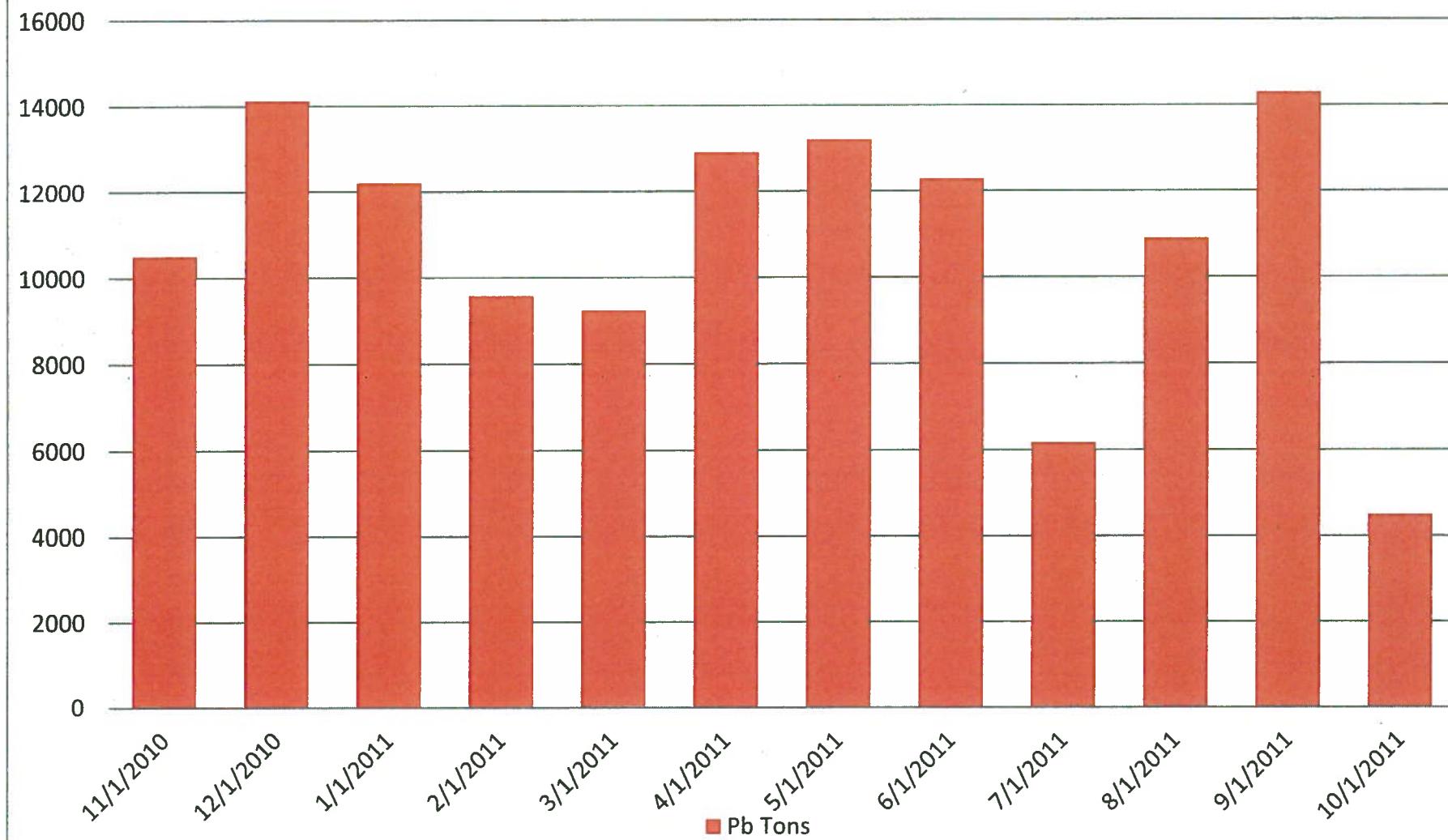


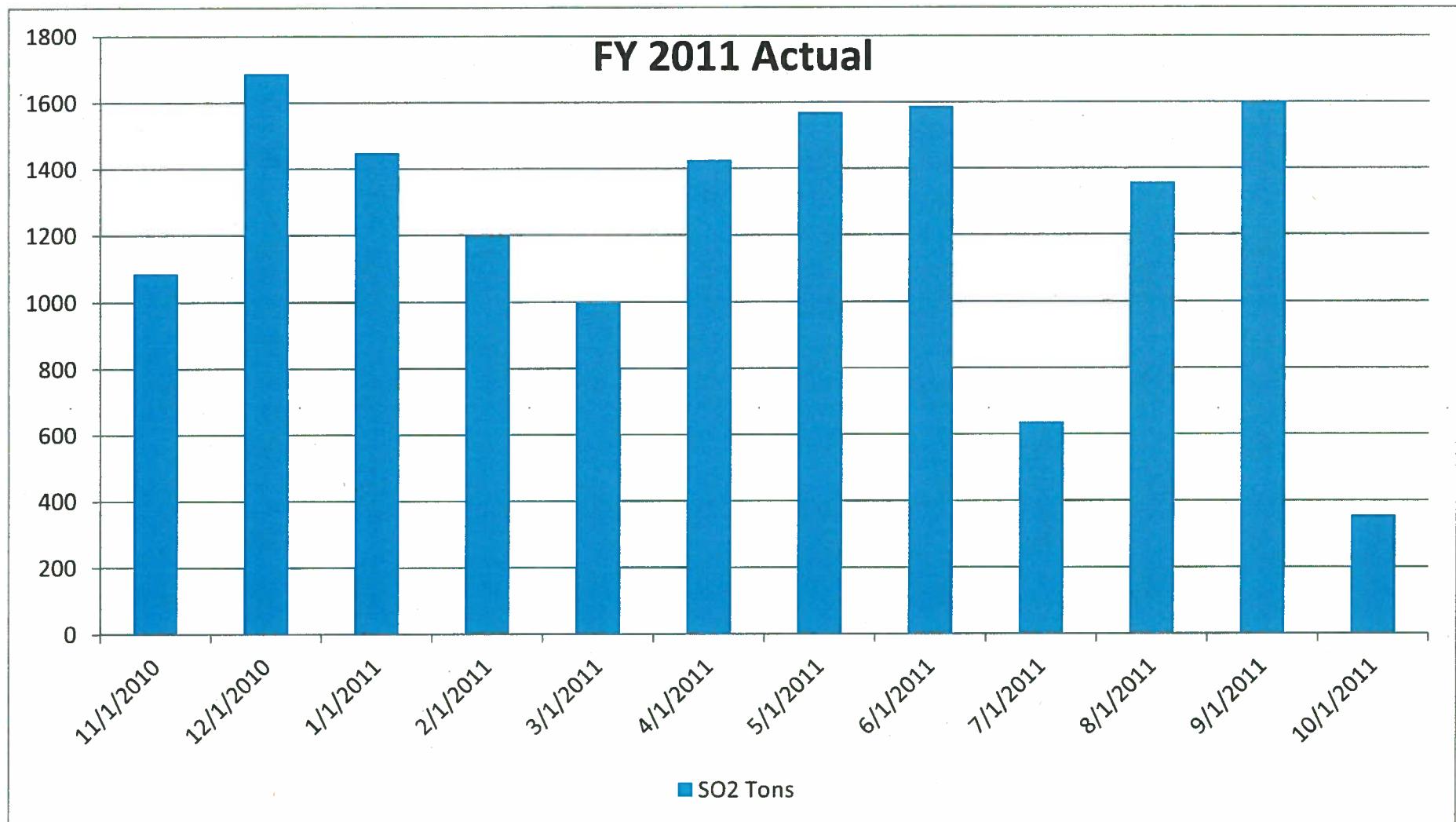


SO₂ Production November 2010

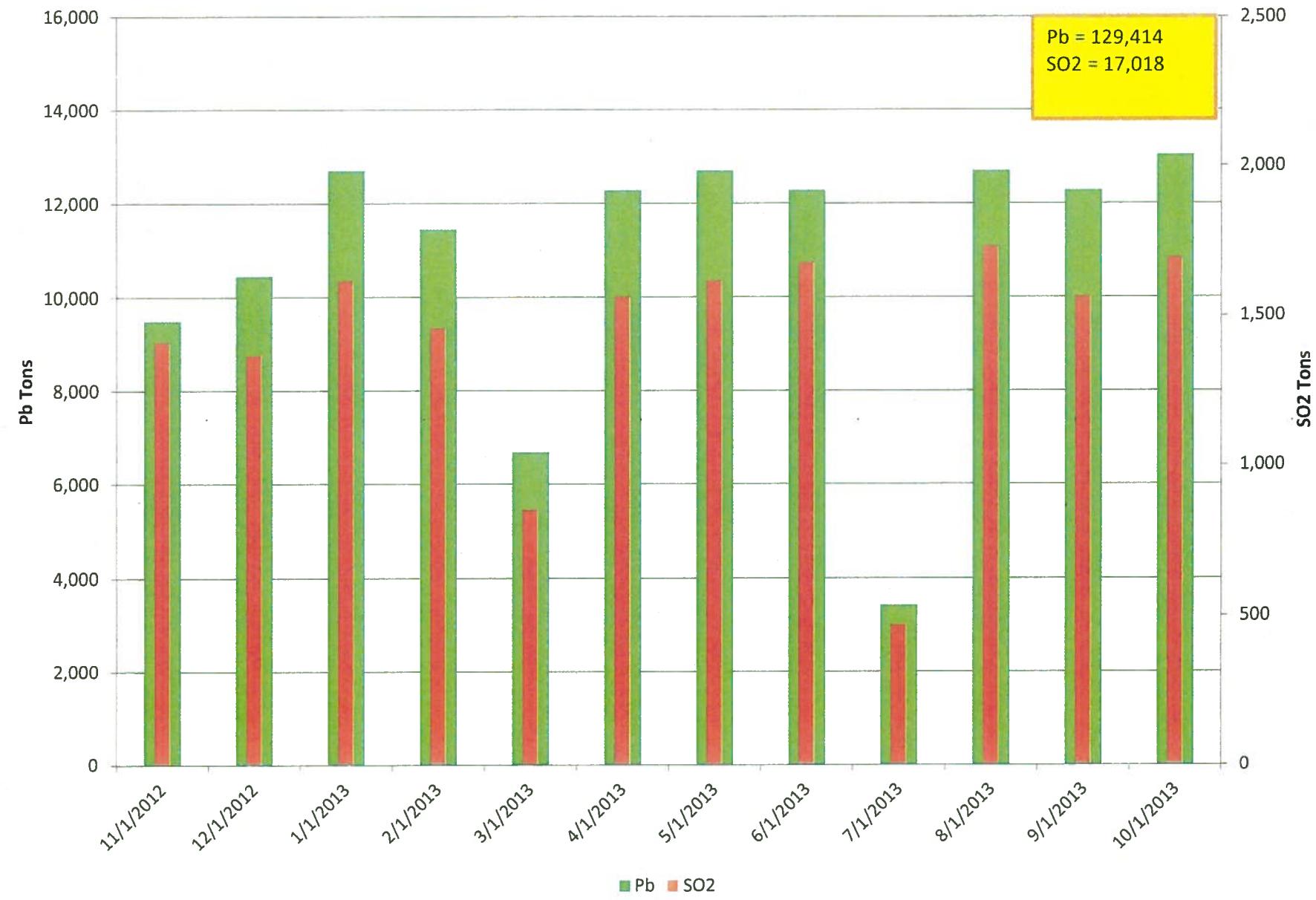


FY 2011 Actual

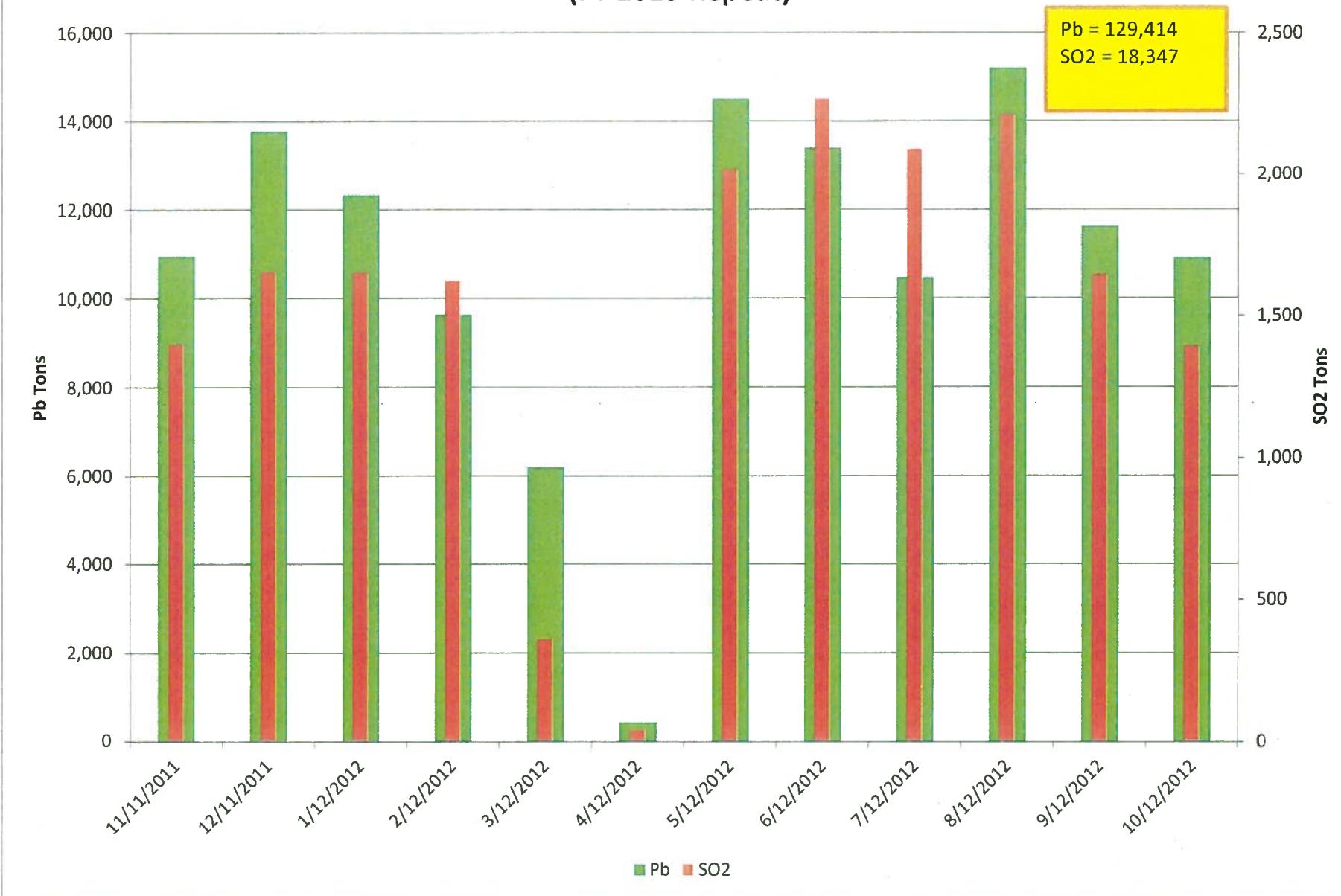




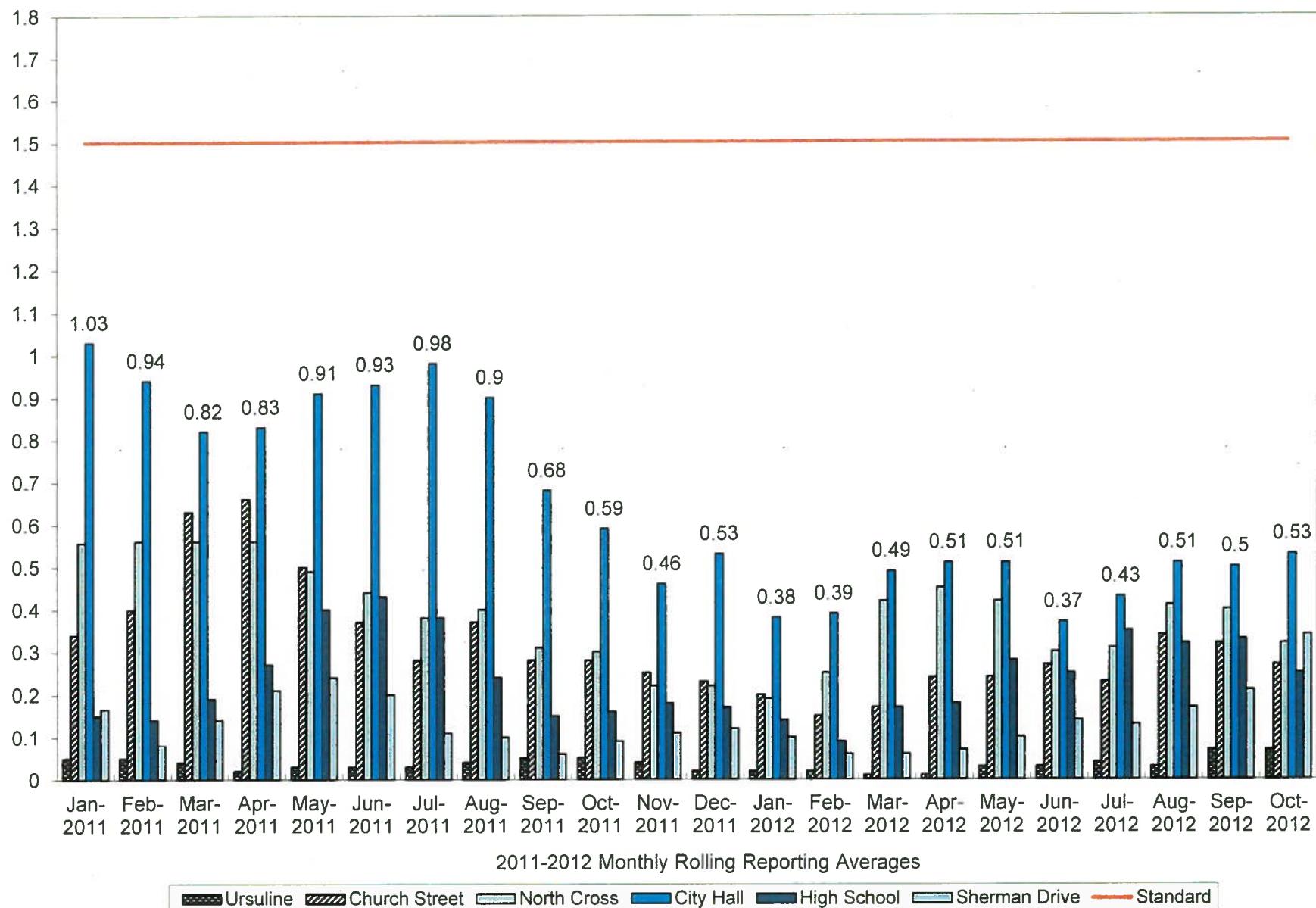
FY 2013 Proposed



**FY 2012 Actual
(FY 2013 Repeat)**



ug Pb/m³/3month Avg.



2010-2011 Operations

| | Pb Prod | 12 mo Pb | SO2 | 12 mo SO2 |
|---------|---------|----------|------|-----------|
| Nov10 | 10457 | | 1087 | |
| Dec10 | 14069 | | 1687 | |
| Jan11 | 12156 | | 1449 | |
| Feb11 | 9530 | | 1198 | |
| Mar11 | 9203 | | 997 | |
| Apr11 | 12858 | | 1425 | |
| May11 | 13155 | | 1570 | |
| Jun11 | 12208 | | 1587 | |
| Jul11 | 6150 | | 636 | |
| Aug11 | 10858 | | 1357 | |
| Sep11 | 14246 | | 1599 | |
| Oct11 | 4450 | 129340 | 355 | 14947 |
| Nov11 | 10950 | 129833 | 1401 | 15261 |
| Dec11 | 13775 | 129539 | 1655 | 15229 |
| CY 2011 | | 129,539 | | 15,229 |

2012 Operations

| | Pb Prod | 12 mo Pb | SO2 | 12 mo SO2 |
|---------|---------|----------|------|-----------|
| Jan12 | 12321 | 129704 | 1652 | 15432 |
| Feb 12 | 9631 | 129805 | 1623 | 15857 |
| Mar 12 | 6207 | 126809 | 361 | 15221 |
| Apr 12 | 434 | 114385 | 40 | 13836 |
| May 12 | 14507 | 115737 | 2016 | 14282 |
| Jun 12 | 13390 | 116919 | 2265 | 14960 |
| Jul 12 | 10468 | 121237 | 2087 | 16411 |
| Aug 12 | 15203 | 125582 | 2210 | 17264 |
| Sep12 | 11620 | 122956 | 1645 | 17310 |
| Oct12 | 10907 | 129413 | 1392 | 18347 |
| Nov12 | 9490 | 127953 | 1412 | 18358 |
| Dec12 | 10445 | 124623 | 1616 | 18069 |
| CY 2012 | | 124,623 | | 18069 |

Proposed 2013 Operations

| | Pb Prod | 12 mo Pb | SO2 | 12 mo SO2 |
|---------|---------|----------|------|-----------|
| Jan13 | 12689 | 124991 | 1616 | 18033 |
| Feb 13 | 11451 | 126811 | 1459 | 17869 |
| Mar 13 | 6679 | 127283 | 851 | 18358 |
| Apr 13 | 12689 | 124991 | 1616 | 18033 |
| May 13 | 12689 | 126811 | 1616 | 19485 |
| Jun 13 | 12689 | 136193 | 1616 | 18894 |
| Jul 13 | 3428 | 129153 | 468 | 17275 |
| Aug 13 | 12689 | 126639 | 1732 | 16797 |
| Sep13 | 12276 | 127295 | 1564 | 16716 |
| Oct13 | 13025 | 129414 | 1694 | 17018 |
| Nov13 | | | | |
| Dec13 | | | | |
| CY 2013 | | 130,000 | | 17,264 |

2010-2011 Operations

| | Pb Prod | 12 mo Pb | SO2 | 12 mo SO2 |
|---------|---------|----------|------|-----------|
| Nov10 | 10457 | | 1087 | |
| Dec10 | 14069 | | 1687 | |
| Jan11 | 12156 | | 1449 | |
| Feb11 | 9530 | | 1198 | |
| Mar11 | 9203 | | 997 | |
| Apr11 | 12858 | | 1425 | |
| May11 | 13155 | | 1570 | |
| Jun11 | 12208 | | 1587 | |
| Jul11 | 6150 | | 636 | |
| Aug11 | 10858 | | 1357 | |
| Sep11 | 14246 | | 1599 | |
| Oct11 | 4450 | 129340 | 355 | 14947 |
| Nov11 | 10950 | 129833 | 1401 | 15261 |
| Dec11 | 13775 | 129539 | 1655 | 15229 |
| CY 2011 | | 129,539 | | 15,229 |

2012 Operations

| | Pb Prod | 12 mo Pb | SO2 | 12 mo SO2 |
|---------|---------|----------|------|-----------|
| Jan12 | 12321 | 129704 | 1652 | 15432 |
| Feb 12 | 9631 | 129805 | 1623 | 15857 |
| Mar 12 | 6207 | 126809 | 361 | 15221 |
| Apr 12 | 434 | 114385 | 40 | 13836 |
| May 12 | 14507 | 115737 | 2016 | 14282 |
| Jun 12 | 13390 | 116919 | 2265 | 14960 |
| Jul 12 | 10468 | 121237 | 2087 | 16411 |
| Aug 12 | 15203 | 125582 | 2210 | 17264 |
| Sep12 | 11620 | 122956 | 1645 | 17310 |
| Oct12 | 10907 | 129413 | 1392 | 18347 |
| Nov12 | 9490 | 127953 | 1412 | 18358 |
| Dec12 | | | 1186 | 17889 |
| CY 2012 | | | | 17,889 |

Proposed 2013 Operations

| | Pb Prod | 12 mo Pb | SO2 | 12 mo SO2 |
|---------|---------|----------|------|-----------|
| Jan13 | 12689 | | 1616 | 17853 |
| Feb 13 | 11451 | | 1459 | 17689 |
| Mar 13 | 6679 | | 851 | 18179 |
| Apr 13 | 12276 | | 1564 | 19703 |
| May 13 | 2689 | | 1616 | 19303 |
| Jun 13 | 12276 | | 1676 | 18714 |
| Jul 13 | 3428 | | 468 | 17095 |
| Aug 13 | 12689 | | 1732 | 16617 |
| Sep13 | 12276 | | 1564 | 16536 |
| Oct13 | 13025 | | 1694 | 16838 |
| Nov13 | | | | |
| Dec13 | | | | |
| CY 2013 | | 130,000 | | |

| FY12 Actual | | | | |
|-------------|--------|------------|-----------------|-------|
| | Pb | Sinter Pro | Sinter Consumed | SO2 |
| 11-Nov | 10950 | 29713 | 29943 | 1401 |
| 11-Dec | 13775 | 27269 | 26776 | 1655 |
| 12-Jan | 12321 | 28000 | 27174 | 1652 |
| 12-Feb | 9631 | 26934 | 27912 | 1623 |
| 12-Mar | 6207 | 6372 | 7379 | 361 |
| 12-Apr | 434 | 665 | 0 | 40 |
| 12-May | 14507 | 32015 | 32595 | 2016 |
| 12-Jun | 13390 | 30044 | 30641 | 2265 |
| 12-Jul | 10468 | 23901 | 23331 | 2087 |
| 12-Aug | 15203 | 32842 | 33536 | 2210 |
| 12-Sep | 11620 | 24909 | 24845 | 1645 |
| 12-Oct | 10907 | 21832 | 22643 | 1392 |
| | 129414 | 284496 | 286775 | 18347 |

| FY13 Proposed | | | | | | | | | | |
|---------------|--------|------------|-----------------|-------|------------|--|--------------------|-------------------------|-------------|----------------|
| | Pb | Sinter Pro | Sinter Consumed | SO2 | Rolling Pb | | Rolling Sinter Pro | Rolling Sinter Consumed | Rolling SO2 | lbs so2/ton pb |
| 12-Nov | 9490 | 18337 | 18421 | 1412 | 127954 | | 273120 | 275253 | 18358 | 298 |
| 12-Dec | 10445 | 26429 | 25735 | 1366 | 124623 | | 272280 | 274212 | 18069 | 262 |
| 13-Jan | 12689 | 31262 | 31262 | 1616 | 124991 | | 275542 | 278300 | 18033 | 255 |
| 13-Feb | 11451 | 28212 | 28212 | 1459 | 126811 | | 276820 | 278600 | 17869 | 255 |
| 13-Mar | 6679 | 16455 | 16455 | 851 | 127283 | | 286903 | 287676 | 18358 | 255 |
| 13-Apr | 12276 | 30245 | 30245 | 1564 | 139126 | | 316483 | 317921 | 19882 | 255 |
| 13-May | 12689 | 31262 | 31262 | 1616 | 137308 | | 315730 | 316588 | 19482 | 255 |
| 13-Jun | 12276 | 30245 | 30245 | 1676 | 136193 | | 315932 | 316192 | 18894 | 273 |
| 13-Jul | 3428 | 8446 | 8446 | 468 | 129153 | | 300476 | 301307 | 17275 | 273 |
| 13-Aug | 12689 | 31262 | 31262 | 1732 | 126639 | | 298896 | 299033 | 16797 | 273 |
| 13-Sep | 12276 | 30245 | 30245 | 1564 | 127295 | | 304233 | 304433 | 16716 | 255 |
| 13-Oct | 13025 | 32759 | 32397 | 1694 | 129414 | | 315160 | 314187 | 17018 | 260 |
| | 129414 | | | 17018 | | | | | | |